BEFORE THE ARIZONA CORPORATION COMMISSION

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Chairman
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Commissioner
JEFF HATCH-MILLER
Commissioner
MIKE GLEASON
Commissioner
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Commissioner

IN THE MATTER OF THE APPLICATION OF ARIZONA PUBLIC SERVICE COMPANY FOR A HEARING TO DETERMINE THE FAIR VALUE OF THE UTILITY PROPERTY OF THE COMPANY FOR RATEMAKING PURPOSES, TO FIX A JUST AND REASONABLE RATE OF RETURN THEREON, TO APPROVE RATE SCHEDULES DESIGNED TO DEVELOP SUCH RETURN, AND FOR APPROVAL OF PURCHASED POWER CONTRACT	DOCKET NO. E-01345A-03-0437

DIRECT

TESTIMONY

OF

JOEL M. REIKER

PUBLIC UTILITIES ANALYST V

UTILITIES DIVISION

ARIZONA CORPORATION COMMISSION

FEBRUARY 3, 2004

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EXECUTIVE SUMMARY

The direct testimony of Staff witness Joel M. Reiker addresses the following issues:

Capital Structure – Staff recommends the Commission adopt APS' actual capital structure consisting of approximately 55 percent debt and 45 percent equity.

Cost of Debt – Staff recommends the Commission adopt a 5.82 percent cost of long-term debt.

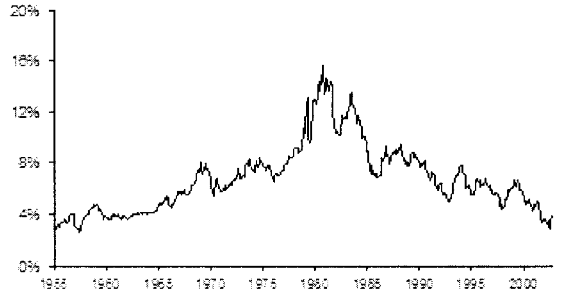
Cost of Equity – Staff recommends the Commission adopt a 9.0 percent return on equity ("ROE"). Staff bases its ROE recommendation on its discounted cash flow ("DCF") and capital asset pricing model ("CAPM") analyses. Staff's recommendation is based on cost of equity estimates ranging from 7.7 percent to 10.6 percent.

Overall Rate of Return - Staff recommends the Commission adopt an overall rate of return ("ROR") of 7.3 percent. Staff's ROR recommendation results in a pre-tax interest coverage ratio of 3.1. This represents a fair and reasonable rate of return on APS' rate base and will allow the Company to maintain its financial integrity.

Comment on the Direct Testimony of Company Witness Charles E. Olson - The Commission should reject Dr. Olson's proposed ROE range of 11.25 percent to 11.75 percent for the following reasons:

> Dr. Olson's assumption that the Company's two alternative capital structures do not affect the cost of equity is incorrect. As a firm increases leverage, the cost of equity goes up. Relying on a 50/50 debt-to-equity capital structure rather than a 55/45 debt-to-equity capital structure lowers APS' cost of equity approximately 30 basis points.
>
> Dr. Olson's 11.25 to 11.75 percent ROE recommendation exceeds a reasonable cost of equity estimate for an average-risk security (based on actual returns). The average compound and arithmetic annual returns on U.S. equities have been 8.3 percent and 9.7 percent, respectively, using 199 years of data from 1802 to 2001. Intermediate-term Treasury securities are currently at levels comparable to the 1950's and '60's, suggesting that capital costs, including the cost of equity, are lower then they have been in decades:

Chart 2: History of 5- and 10-Year Treasury Yields



> Dr. Olson's DCF estimates should be rejected for the following reasons:

1. Dr. Olson's sample group is riskier than APS, as evidenced by an average debt ratio of .60 compared to APS' debt ratio of .55.

2. Dr. Olson's use of an average dividend yield in the constant growth DCF model is inappropriate. There is no point in "smoothing" stock prices for use in a model that assumes perfect markets.

3. Dr. Olson's expected dividend yield for IDACORP is overstated by 338 basis points according to data of October 9, 2003.

4. Dr. Olson's exclusive reliance on analysts' forecasts of earnings growth in the constant growth DCF model is inappropriate because it assumes that investors do not look at other information such as past growth, and analysts' forecasts of earnings growth are known to be overly optimistic. To the extent investors are aware of the bias in analysts' projections of future earnings, they will make appropriate adjustments. Further, *First Call*, which Dr. Olson relies on exclusively in his constant growth DCF analysis, has revised its earnings growth estimates downward since Dr. Olson completed his analysis.

5. After correcting the errors contained in his analysis, Staff's restatement of Dr. Olson's constant growth DCF estimate averages 9.0 percent.

Dr. Olson's risk premium study should be rejected for the following reasons:

1. The yield to maturity on a corporate bond cannot be meaningfully compared to the cost of equity because a corporate bond contains some default risk which is diversifiable. Therefore, the investor's expected return is lower than the bond's yield to maturity.

2. Dr. Olson misapplies the historical differential between S&P 500 returns and *high grade* corporate bond yields to the current yield on *medium grade* bonds. To the extent there is any validity to such a risk premium study, Dr. Olson's cost of equity estimate is inflated by 114 basis points.

3. Dr. Olson's risk premium study in no way assesses the risk of an electric utility. Dr. Olson's risk premium study is inappropriate because it fails to distinguish the risk of an electric utility with the risk of the S&P 500, which includes a wide range of companies such as aerospace/defense, computers, etc.

4. Dr. Olson's risk premium study is based on a general rule of thumb. The Commission should primarily rely on cost of equity models developed in the corporate finance literature, such as the DCF and CAPM, rather than on rules of thumb. The DCF method is the most widely used model for estimating the cost of equity in public utility

rate cases and the CAPM is the most popular method of estimating the cost of equity among firms.

Dr. Olson's financing cost adjustment should be rejected for the following reasons:

1. Dr. Olson fails to consider in his testimony stock expenses that would reduce his adjustment. Stock purchase fees, otherwise known as brokers' fees, result in an investor paying more than the price quoted on the market, and would reduce the required dividend yield in the DCF, offsetting the issuance cost adjustment.

2. Dr. Olson fails to consider stock that Pinnacle West and other companies issue under employee stock ownership plans ("ESOP") and dividend reinvestment plans ("DRIP"), which save the underwriting costs of a regular share issue.

3. Dr. Olson's method of increasing the authorized ROE applies to retained earnings – equity that is never issued.

Dr. Olson's suggestion that "market pressure" associated with stock offerings should be compensated for in the ROE should be rejected for the following reasons:

1. The market pressure component is inconsistent with the concept of efficient markets, the theory inherent in the DCF and CAPM.

2. The alternative explanation for a decline in stock price after the announcement of a public offering has nothing to do with the increased supply but simply with the information that the issue provides. Most financial economists agree with this alternative explanation.

INTRODUCTION

Q. Please state your name, occupation, and business address.

A. My name is Joel M. Reiker. I am a Senior Regulatory Analyst employed by the Arizona Corporation Commission ("ACC" or "Commission") in the Utilities Division ("Staff"). My business address is 1200 West Washington Street, Phoenix, Arizona 85007.

Q. Briefly describe your responsibilities as a Senior Regulatory Analyst.

A. In my capacity as a Senior Regulatory Analyst, I perform studies to estimate the cost of capital for utilities that are seeking rate relief. I also provide recommendations to the Commission on mergers, acquisitions, financings, and sales of assets, and I have occasionally acted as arbitrator in disputes brought before the Utilities Division.

Q. Please describe your educational background and professional experience.

A. In 1998, I graduated cum laude from Arizona State University, receiving a Bachelor of Science degree in Global Business with a specialization in finance. My course of studies included classes in corporate and international finance, investments, accounting, statistics, and economics. I began employment as a Staff rate analyst in 1999. Since that time, I have attended various seminars and classes on general regulatory and business issues, including the cost of capital and the use of energy derivatives. I have participated in over fifty regulatory proceedings.

Q. What is the scope of your testimony in this case?

A. I provide Staff's recommended rate of return in this case. I address the appropriate capital structure, as well as the appropriate costs of debt and equity for establishing the revenue requirement for Arizona Public Service Company ("APS" or "Company").

SUMMARY OF TESTIMONY AND RECOMMENDATIONS

Q. Briefly summarize how Staff's cost of capital testimony is organized.

A. Staff's cost of capital testimony is organized into six sections. Section I discusses the Company's capital structure. Section II discusses APS' cost of debt. Section III discusses risk and presents the findings of Staff's cost of equity capital analysis that uses the discounted cash flow ("DCF") model and the capital asset pricing model ("CAPM"). Section IV presents Staff's recommended return on equity ("ROE") for APS. Section V presents Staff's overall rate of return ("ROR") recommendation. Finally, Staff's comments on the Company's proposed ROE are presented in section VI.

Q. Have you prepared any exhibits to your testimony?

A. Yes. I prepared eleven schedules (JMR-1 to JMR-11) and two exhibits (JMR-1 and JMR-2) that support Staff's cost of capital analysis.

Q. Please summarize Staff's ROR recommendations.

A. Staff's ROR recommendation is summarized in the following table:

Table 1

	Weight	Cost	Weighted Cost
Long-term Debt	54.8%	5.82%	3.19%
Common Equity	45.2%	9.0%	4.07%
Cost of Capital/ROR			**7.3%**

I. APS' CAPITAL STRUCTURE

Q. What capital structure did Staff rely on to calculate its recommended rate of return?

A. Staff relied on APS' actual capital structure consisting of approximately 55 percent debt and 45 percent equity. According to the Company's response to Staff data requests STF 2.8 and STF 2.9 (Exhibit JMR-1), APS' capital structure on June 30, 2003 consisted of approximately 55 percent debt and 45 percent equity. Additionally, according to Schedule D-1 of the Company's application, APS' capital structure is expected to be approximately 55 percent debt and 45 percent equity on December 31, 2003.

Q. What capital structure does APS propose?

A. The Company proposes two alternative capital structures depending on whether the Pinnacle West Energy Corporation ("PWEC") generating assets[1] are included in rate base.

If the Commission allows APS to include the PWEC generating assets in rate base, the Company proposes its actual capital structure consisting of approximately 55 percent debt and 45 percent equity. If the PWEC generating assets are not included in rate base, the Company proposes its December 31, 2002 historical capital structure, which consisted of approximately 50 percent debt and 50 percent equity. The former recognizes an additional $500 million in long-term debt issued by APS in May, 2003.[2]

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[1] West Phoenix combined cycle generating units 4 & 5, Saguaro combustion turbine Unit No. 3 and Redhawk Units 1 & 2.

[2] On April 4, 2003, the Commission issued Decision No. 65796, authorizing APS to issue up to $500 million in long term debt. On May 7, 2003, APS issued $500 million in unsecured notes and subsequently loaned the funds to its affiliate, Pinnacle West Energy Corporation ("PWEC"). The funds loaned to PWEC are intended to pay off an equivalent amount of Pinnacle West Capital Corporation ("PWCC") (APS' parent) debt previously incurred to finance construction of PWEC generating assets.

Q. Does APS' capital structure and cost of capital depend on whether the PWEC generating assets are included in rate base?

A. No. The $500 million issuance of May, 2003 is debt of the Company regardless of what is included in rate base. Investors do not ignore debt, nor do they color-code it. Therefore, the Company's actual capital structure (approximately 55 percent debt and 45 percent equity) is required to estimate APS' *current* cost of capital in this proceeding.

II. THE COST OF DEBT

Q. What is Staff's recommended cost of debt?

A. Staff recommends a 5.82 percent cost of long-term debt. Staff calculated its recommended cost of debt using APS' December 31, 2003, projected balances.[3] Staff's calculation is shown in Schedule JMR-2.

Q. What is the Company's proposed cost of debt?

A. The Company's proposed cost of debt depends upon which capital structure is adopted. If a capital structure consisting of approximately 50 percent debt and 50 percent equity is adopted, APS proposes a 5.81 percent cost of debt. If a capital structure consisting of 55 percent debt and 45 percent equity is adopted, APS proposes a 5.76 percent cost of debt.

Staff calculated its recommended cost of debt using the internal rate of return ("IRR") methodology and it is slightly higher than APS' proposed cost of debt under the 55 percent debt/45 percent equity scenario.

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[3] Per APS' response to STF 3-10 attached as Exhibit JMR-2.

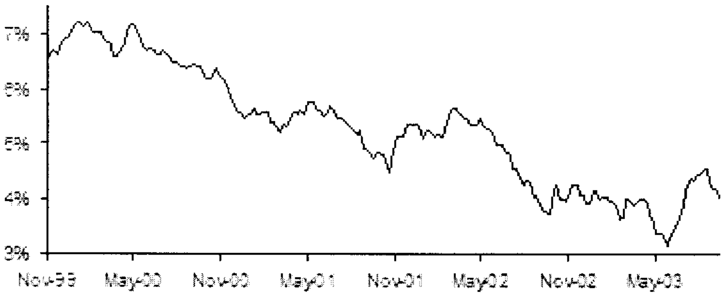
III. THE COST OF EQUITY

Comment on Capital Costs in General

Q. What has been the general trend of capital costs in recent years?

A. Interest rates have declined in recent years. Chart 1 graphs intermediate-term U.S. Treasury rates from November 1999 to October 2003:

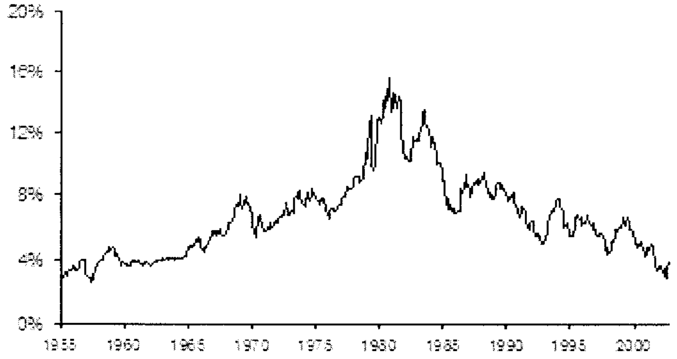
Chart 1: Average Yield on 5-, 7-, & 10-Year Treasuries



Source: Federal Reserve

The following graph puts interest rates and capital costs in general, into historical perspective. Interest rates have declined significantly in the past twenty years and are currently at levels comparable to the 1950's and '60's.

Chart 2: History of 5- and 10-Year Treasury Yields



Source: Federal Reserve

According to the capital asset pricing model, the cost of equity moves in the same direction as interest rates. Chart 2 suggests that capital costs, including the cost of equity, are lower than they have been in decades.

Q. What have historical returns been for average risk securities?

A. Wharton School finance professor Jeremy Siegel published his findings that the average compound and arithmetic annual returns on U.S. equities have been 8.3 percent and 9.7 percent, respectively, using 199 years of data from 1802 through 2001.[4]

One should keep in mind that the above returns are actual returns, not expected returns. However, any request for an allowed ROE at or above 10.0 percent exceeds the compound and arithmetic average historical return on U.S. equities for the period mentioned above. The risk of a regulated electric utility, as measured by the capital asset pricing model beta, is significantly below the theoretical average beta for all stocks of 1.0. I discuss the average beta (.67) of the electric utility industry later. Therefore, the required return on an investment in the electric utility industry is significantly below the average required return on the market.

Capital Structure and Risk

Q. How is risk defined?

A. Modern portfolio theory ("MPT") separates risk into two categories; market risk and unique risk. Market risk is defined as the sensitivity of an investment's returns to market returns. Market risk, also known as systematic risk, is the risk related to economy-wide perils that threaten all businesses such as changes in interest rates, inflation, and general business cycles. Market risk is the only type of risk that affects the cost of equity. The most prevalent measure of market risk is "beta." Beta is the measurement of an investment's market risk, and it reflects both the business risk and financial risk of a firm.

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[4] Siegel, Jeremy J. *Stocks for the Long Run*, third edition. McGraw-Hill, New York. 2002. p.13.

Unique risk, or microeconomic risk, is risk that can be eliminated by portfolio diversification, i.e. buying securities in portfolios. Unique risk is not measured by beta nor does it factor into the cost of equity because it can be eliminated through simple shareholder diversification. Unique risks are peculiar to an individual company or investment project. Investors who hold diversified portfolios do not worry about unique risk; therefore, it does not affect the cost of capital. Additionally, investors who choose to be less than fully diversified will not expect to be compensated for unique risk.

Q. Please distinguish between business risk and financial risk.

A. Business risk is the risk associated with the fluctuation in earnings due to the basic nature of a firm's business. Financial risk is the risk to shareholders caused by a firm's reliance on debt financing. Both business risk and financial risk affect the cost of capital.

Q. What is the relationship between the capital structure and financial risk?

A. A greater percentage of debt in a capital structure results in a higher level of financial risk.

Q. How does APS' capital structure compare to capital structures of publicly traded electric utilities?

A. APS' current capital structure has approximately the same percentages of debt and equity as the average capital structure of publicly traded electric utilities; therefore, APS has approximately the same level of financial risk. Schedule JMR-1 shows the average capital structure of thirty-three publicly traded electric utilities ("sample electric utilities") as of 2003, as well as APS' capital structure. As of June 2003, the sample electric utilities were capitalized with approximately 56 percent debt while APS' capital structure consists of approximately 55 percent debt. The sample electric utilities and their selected financial data are listed in Schedule JMR-3.

Fair and Reasonable Return on Equity

Q. Define the term "cost of equity."

A. A firm's cost of equity is that rate of return that investors expect to earn on their equity investment given the risk of the firm. An investor's expected return is equally defined as the return on equity that he expects on other investments of similar risk.

Q. What models did Staff use to estimate APS' cost of equity?

A. Staff used two market-based models: the discounted cash flow ("DCF") model and the capital asset pricing model ("CAPM"). Staff applied these two models to publicly traded stocks to estimate APS' cost of equity.

Q. Did Staff apply the DCF model and the CAPM to APS directly?

A. No, Staff did not apply the models directly to APS because APS does not have publicly traded stock and Staff therefore lacks the information necessary to apply the market-based models. Staff used a sample of publicly traded electric utilities as a proxy.

Q. What companies did Staff select as proxies or comparables for APS?

A. Staff selected the thirty-three publicly traded electric utilities shown in Schedule JMR-3. These companies represent all of the electric utilities currently followed by *The Value Line Investment Survey* ("*Value Line*") who have at least 65 percent of their revenues derived from regulated operations, pay dividends, and are not currently in bankruptcy or expected to be in bankruptcy.

Discounted Cash Flow Model Analysis

Q. Please provide a brief summary of the theory upon which the DCF method of estimating the cost of equity is based.

A. The DCF method of estimating the cost of equity is based upon the theory that the market price of a stock is equal to the present value of all expected future dividends. Through a mathematical restatement, the discount rate, or cost of capital, can be derived from the expected dividend, the stock price, and a dividend growth rate. The formula is generally applied to a sample of companies that exhibit similar risk to the company in question and the resulting estimates for the discount rates (or costs of equity) are then averaged.

Use of the DCF method for estimating the cost of equity capital to a public utility was pioneered by Professor Myron Gordon in the 1960's, and it has become the most widely used model. In 1998, Professor Gordon said the following about the simplicity of his model when he gave the keynote Address at the 30th Financial Forum of the Society of Utility and Regulatory Financial Analysts:

> On its simplicity, the model made it extremely difficult, if not impossible, for a banker from Goldman Sachs or some other Wall Street firm, or for a finance professor from a prestige university to use the authority of his/her position to make extravagant claims before a regulatory agency. An independent expert or a member of a commission staff with far less impressive credentials could politely, firmly and effectively deflate any bombast in their testimony.[5]

Q. How did Staff apply the DCF Model?

A. Staff applied the DCF model using two different approaches. Staff's first approach used the constant-growth DCF model. Staff's second approach was to use a non-constant growth, or multi-stage DCF. The advantage of the multi-stage DCF is that it does not assume that dividends grow at a constant rate over time.

The Constant-Growth DCF

Q. What is the constant-growth DCF formula used in Staff's analysis?

A. The constant-growth DCF formula used in Staff's analysis is:

Equation 1:

$$K = \frac{D_1}{P_0} + g$$

where: K = the cost of equity
D_1 = the expected annual dividend
P_0 = the current stock price
g = the expected infinite annual growth rate of dividends

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[5] Gordon, M. J. Keynote Address at the 30th Financial Forum of the Society of Utility and Regulatory Financial Analysts. May 8, 1998. Transparency 2.

The constant-growth DCF model shown in Equation 1 assumes that a company has a constant payout ratio and that its earnings are expected to grow at a constant rate. Thus, if a stock has a market price of $5 per share, an expected annual dividend of $.25 per share, and if its dividends were expected to grow 3 percent per year, then the cost of equity for the company would be 8.0 percent (the 5 percent dividend yield plus the growth rate of 3 percent per year).

Q. How did Staff calculate the dividend yield component (D_1/P_0) of the constant-growth DCF formula?

A. Staff calculated the yield component of the DCF formula by dividing the expected annual dividend by the spot stock price after the close of the market on October 9, 2003, as reported by *Yahoo Finance.*

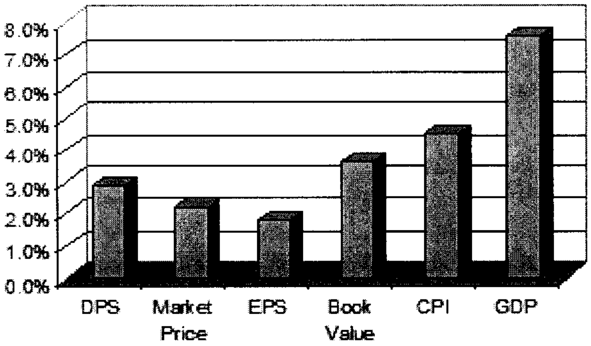
Staff used the spot stock price because it reflects all publicly available information. According to the efficient markets hypothesis, the current stock price includes investors' expectations of future returns and is the best indicator of these expectations.

Electric Utility Growth in General

Q. How fast have electric utilities grown compared to inflation and the economy in general?

A. Growth rates for electric utilities lag not only the growth rate of the economy, but they lag the rate of inflation as well. From 1960 to 2000, dividends per share ("DPS") for electric utilities grew at a rate of 2.9 percent per year. Earnings per share ("EPS") grew at a rate of 1.8 percent. Market price grew at a rate of 2.2 percent, and book value grew at a rate of 3.6 percent.[6] Over the same period gross domestic product ("GDP") and the consumer price index ("CPI") grew at rates of 7.6 percent and 4.5 percent, respectively.[7] The following chart provides historical perspective:

Chart 3: Electric Utility Growth Rates Versus Consumer Price Index & GDP 1960 - 2000



The above data represent past growth. To the extent investors rely on such past data to form expectations of future growth, electric utilities can be expected to grow at a rate that lags not only the growth rate of the economy, but inflation as well. Future long-term dividend growth for electric utilities in the range of 5 to 6 percent would be unusual, relative to the data presented above.

Q. How did Staff estimate the dividend growth (g) component of the DCF model?

A. Because the DCF model is predicated on dividend growth, Staff examined a combination of historical DPS growth and projections of future DPS growth provided by *Value Line.* Staff also examined historical and projected growth in EPS as well as intrinsic growth.

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[6] *Mergent Public Utility & Transportation Manual 2003*

[7] U.S. Department of Commerce Bureau of Economic Analysis and U.S. Department of Labor Bureau of Labor Statistics.

Q. How did Staff estimate DPS growth?

A. Staff estimated DPS growth by calculating the average rate of growth in dividends per share of the sample electric companies from 1997 to projected 2007. The results of the analysis are shown in Schedule JMR-4. Staff's analysis indicates an average DPS growth rate of 0.2 percent for the sample electric utilities.

Q. Why did Staff examine EPS growth to estimate the dividend growth component of the constant-growth DCF model?

A. Staff examined EPS growth because dividend growth does not occur independently of earnings. It would be virtually impossible for dividend growth to exceed earnings growth over the long run, as it would ultimately lead to payout ratios in excess of 100 percent, which are not sustainable. Therefore, Staff considered historical and projected growth in EPS in estimating expected dividend growth.

Q. What is Staff's EPS growth rate?

A. Schedule JMR-4 shows Staff's average rate of growth in EPS for the sample electric utilities. Staff's average EPS growth rate is 3.4 percent using data from 1997 to projected 2007 for the sample electric utilities.

One should note that analysts' projections of future earnings are generally high,[8] and vary widely depending on the source.

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[8] See Seigel, Jeremy J. Stocks for the Long Run. 2002. McGraw-Hill. New York. p. 100. Malkiel, Burton G. A Random Walk Down Wall Street. 1999. W.W. Norton & Co. New York. p. 169. Dreman, David. Contrarian Investment Strategies: The Next Generation. 1998. Simon & Schuster. New York. pp. 97-98. Testimony of Professors Myron J. Gordon and Lawrence I. Gould, consultant to the Trial Staff (Common Carrier Bureau), FCC Docket 79-63, p. 95.

Q. What is retention growth?

A. Retention growth is simply the product of the percentage of earnings retained by the company ("retention ratio") and the book/accounting return on equity. This concept is based upon the theory that dividend growth can only be achieved if a company retains and reinvests a portion of its earnings in itself to earn a return.

Q. What is the formula for the retention growth rate?

A. The retention growth rate formula is:

Equation 2:

$$g = br$$

where:
g = retention growth
b = the retention ratio (1 – dividend payout ratio)
r = the accounting/book return on common equity

Q. What retention (br) growth rate did Staff calculate for the sample electric utilities?

A. Staff calculated an average retention (br) growth rate of 4.5 percent for the sample electric utilities, as shown on Schedule JMR-5. Staff calculated the rate by averaging the retention growth rate for the years 1998 to 2002, and *Value Line*'s projected br growth rate for the period 2006 - 2008.

Q. Under what circumstances is the br growth rate method a reasonable estimate of future dividend growth?

A. The br growth rate is a reasonable estimate of future dividend growth if the retention ratio is fairly constant and if the market price to book value ("market-to-book") ratio is expected to equal 1.0. The average retention ratio of the sample electric utilities has ranged from 10 percent to 40 percent since 1997. The average market-to-book ratio of the sample electric utilities is 1.5. (See Schedule JMR-3.) Staff assumes that investors expect the market-to-book ratio to remain above 1.0.

Q. What is the financial implication of a market-to-book ratio greater than 1.0?

A. The implication is that investors expect the sample electric utilities to earn book/accounting returns on equity greater than the companies' costs of equity.

Q. How has Staff accounted for the assumption that investors expect the average market-to-book ratio of the sample electric utilities to remain above 1.0?

A. Staff accounted for the assumption that investors expect the average market-to-book ratio of the sample electric utilities to remain above 1.0 by adding a second growth term to its br growth rate to arrive at the intrinsic growth rate.

Q. What is the second growth term Staff used to account for the assumption that investors expect the average market-to-book ratio of the sample electric utilities to remain above 1.0?

A. The second growth term, derived by Myron Gordon in his book, *The Cost of Capital to a Public Utility*[9], is found by multiplying a variable, v, by another variable, s. Staff will refer to the product of v and s as the vs, or stock financing growth term. The vs growth term represents the company's dividend growth through the sale of stock.

Q. What does the variable v represent and how is it calculated?

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[9] Gordon, Myron J. *The Cost of Capital to a Public Utility*. MSU Public Utilities Studies, Michigan, 1974. pp 31-35.

A. The variable v represents the fraction of the funds raised from common stock sales that accrues to existing shareholders. It is calculated as follows:

Equation 3:

$$v = 1 - \left(\frac{book\ value}{market\ value} \right)$$

For example, if a share of stock with a $10 book value is selling for $13, the v term would equal .23 (calculated as 1-[$10/$13]). Staff has calculated v for the sample electric utilities to be .30.

Q. What does the variable s represent and how is it calculated?

A. The variable s represents the expected rate of increase in common equity from stock sales. For example, if a company has $100 in equity and it sells $10 of stock then s would equal 10 percent ($10/$100). Staff used historical accounting data to calculate an average s value for the sample electric utilities of 4.6 percent.

Q. How does the vs term work?

A. When a utility is expected to earn a book/accounting return equal to its cost of equity, then its market price will equal its book value and v will be equal to 0.0 (calculated as 1-($10/$10)). If a utility is expected to earn more than its cost of equity, then its market-to-book ratio will be greater than 1.0. If the market-to-book ratio is greater than 1.0 and v is positive when new shares are sold, then the book value per share of outstanding stock is less than the per share contributions of new shareholders. The per-share contribution in excess of book value per share accrues to the old shareholders in the form of a higher book value. The resulting higher book value leads to higher expected earnings and dividends. Thus, the growth term in the basic DCF model should include the vs growth term when the market-to-book ratio is not expected to equal 1.0. Staff's vs growth term is 1.4 percent.

Q. Shouldn't utilities' market-to-book ratios fall to 1.0 if their authorized ROEs are set equal to their costs of equity?

A. Yes. Utilities' market-to-book ratios should fall to 1.0, in theory, making the vs term unnecessary. Setting the authorized return on equity for a utility equal to its cost of equity should eventually force the utility's market price to equal its book value. In principle, then, the vs term is unnecessary in the long run. In reality, rate orders do not force market-to-book ratios to 1.0 for a variety of reasons. For example, regulatory commissions do not issue orders simultaneously for multijurisdictional utilities, and a company may have earnings that are unregulated. Therefore, Staff included the vs growth term in its DCF analysis, even though the resulting growth rate estimate might be too high. Staff's resulting estimates are too high to the extent that investors expect the sample's average market-to-book ratio to fall to 1.0 because of falling authorized ROEs.

Q. What is Staff's intrinsic growth rate and how was it calculated?

A. Staff's intrinsic growth rate is 5.9 percent for the sample electric companies. It was calculated by adding Staff's br and vs growth rates and is shown in Schedule JMR-5.

Q. What is Staff's expected infinite annual growth rate in dividends?

A. Schedule JMR-6 shows Staff's calculation of expected dividend growth. Staff's expected annual dividend growth rate is also shown in the following table:

Table 2

Growth Rate	g
Dividends Per Share (DPS)	0.2%
Earnings Per Share (EPS)	3.4%
Intrinsic Growth	5.9%
Average	**3.2%**

Q. What is the result of Staff's constant-growth DCF analysis?

A. Schedule JMR-7 shows the result of Staff's constant-growth DCF analysis. Staff's constant-growth DCF cost of equity estimate is also shown below:

Table 3

D_1/P_0	+	g	=	k
4.5%	+	3.2%	=	**7.7%**

The Multi-Stage DCF

Q. What is the multi-stage DCF formula?

A. The multi-stage DCF formula is shown in the following equation:

Equation 4 :

$$P_0 = \sum_{t=1}^{n} \frac{D_t}{(1+K)^t} + \frac{D_n(1+g_n)}{K-g_n}\left[\frac{1}{(1+K)}\right]^n$$

Where : P_0 = current stock price
D_t = dividends expected during stage 1
K = cost of equity
n = years of non – constant growth
D_n = dividend expected in year n
g_n = constant rate of growth expected after year n

The multi-stage DCF model shown above incorporates at least two growth rates. It assumes that investors expect a certain rate of non-constant dividend growth in the near term known as "stage-1 growth", as well as a longer-term constant rate of growth known as "stage-2 growth."

Q. How did Staff implement the multi-stage DCF model?

A. Staff forecasted a stream of dividends and found the cost of equity that equates the present value of the stream to the current stock price for each of the sample electric utilities, consistent with Equation 4.

Q. How did Staff calculate stage-1 growth?

A. Staff forecasted dividends four years out for each of the sample electric utilities using *Value Line*'s estimate of the projected dividend for the next twelve months and *Value Line*'s projected DPS growth rate.

Q. How did Staff estimate stage-2 growth?

A. For stage-2 growth, or constant growth, Staff used the rate of growth in gross domestic product ("GDP") from 1929 to 2002, which is 6.5 percent. Historical growth in GDP is appropriate because it ultimately assumes that the electric utility industry will neither grow faster, nor slower, than the overall economy.

Q. What is the result of Staff's multi-stage DCF analysis?

A. Staff's multi-stage DCF estimate of the cost of equity to the sample electric utilities is 10.6 percent.

Capital Asset Pricing Model

Q. Please describe the capital asset pricing model.

A. The CAPM is the best-known model of risk and return. The CAPM is the work of Nobel prize-winning economists and provides a method to estimate the risk and expected return on a risky asset. The model concludes that the expected return on a risky asset is equal to the sum of the prevailing risk-free interest rate and the market risk premium adjusted for the riskiness of the investment relative to the market. The critical assumptions of the CAPM can be summed up in the following quote from the book, *The Stock Market: Theories and Evidence*:[10]

> The [CAPM] model presents a simple and intuitively appealing picture of financial markets. All investors hold efficient portfolios and all such portfolios move in perfect lockstep with the market. Portfolios differ only in their sensitivity to the market. Prices of all risky assets adjust so that their returns are appropriate, in terms of the model, to their riskiness. This riskiness is measured by a simple statistic, beta, which indicates the sensitivity of the asset to market movements.

According to a 2001 study published in the *Journal of Financial Economics*, among CFOs the CAPM is by far the most popular method of estimating the cost of equity.[11]

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[10] Lorie, James, Mary T. Hamilton. *The Stock Market: Theories and Evidence*. Richard D. Irwin, Inc. Homewood, Illinois. 1973. p. 202.

[11] Graham, John R., Campbel R. Harvey. "The Theory and Practice of Corporate Finance: Evidence from the Field." *Journal of Financial Economics*. 60 (2001) pp. 187-243.

Q. What is the CAPM formula?

A. The CAPM formula is shown in the following equation:

Equation 5 :

$$K = R_f + \beta\,(R_m - R_f)$$

where : R_f = risk free rate
R_m = return on market
β = beta
$R_m - R_f$ = market risk premium
K = expected return

Q. How was the CAPM implemented to estimate APS' cost of equity?

A. Staff implemented the CAPM on the same sample electric utilities to which it applied the DCF model.

Q. What risk-free rate of interest did Staff estimate?

A. Staff estimated the risk-free rate to be 3.7 percent. The estimate is based upon an average of intermediate-term U.S. Treasury securities' spot rates published in *The Wall Street Journal.* Published rates, as determined by the capital markets, are objective, verifiable, and readily available, as opposed to rates published by a forecasting service which are not necessarily objective, and are certainly not necessarily verifiable or readily available. Staff averaged the yields-to-maturity of three intermediate-term[12] (five-, seven-, and tenyear) U.S. Treasury securities quoted in the October 10, 2003, edition of *The Wall Street Journal*. Intermediate-term rates averaged 3.7 percent.[13]

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[12] The use of intermediate-term securities is based on the theoretical specification that the time to maturity approximates the investor's holding period, and assumes that most investors consider the intermediate time frame (5-

Q. What beta (β) did Staff use?

A. Staff used the average of the *Value Line* betas for the thirty-three sample electric utilities in its analysis as a proxy for APS' beta. Column 'F' of Schedule JMR-3 shows that the average *Value Line* beta is .67 for the sample electric companies.

Q. Please describe the expected market risk premium ($R_m - R_f$).

A. The expected market risk premium is the amount of additional return that investors expect from investing in the market (or an average-risk security) over the risk-free asset.

Q. What is Staff's estimate of the expected market risk premium?

A. Staff's estimate for the market risk premium is 7.4 percent.

Q. How did Staff calculate the expected market risk premium?

A. Two approaches were used. The first approach is an estimate of the historical market risk premium. The second approach is an estimate of the current market risk premium.

Q. Please describe Staff's first approach to estimating the market risk premium: estimating the historical market risk premium.

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10 years) a more appropriate investment horizon. See Reilly, Frank K., and Keith C. Brown. Investment Analysis and Portfolio Management. 2003. South-Western. Mason, OH. p. 439.

[13] Average yield on 5-, 7-, and 10-year Treasury notes according to the October 10, 2003, edition of *The Wall Street Journal*: 3.18%, 3.72%, and 4.30%, respectively.

A. For the first approach, Staff assumed that the average historical market risk premium is a reasonable estimate of the expected market risk premium. If one consistently uses the long-run average market risk premium to estimate the expected market risk premium, one should, on average, be correct.

Staff used the historical intermediate-term market risk premium published in Ibbotson Associates' *Stocks, Bonds, Bills and Inflation 2003 Yearbook* for the 77-year period from 1926 to 2002. Ibbotson Associates' calculation is the arithmetic average difference between S&P 500 returns and intermediate-term government bond income returns. The 77-year period is used to eliminate shorter-term biases while at the same time including unexpected past events including business cycles. Staff's market risk premium estimate using this approach is 7.4 percent.

Q. Please describe the second approach to estimating the market risk premium: estimating the current market risk premium.

A. Staff's second approach essentially boils down to inserting a DCF-derived ROE into the CAPM equation, along with a beta and long-term risk-free rate, and solving the CAPM equation for the implied market risk premium. *Value Line* projects the expected dividend yield (next 12 months) and growth for all dividend-paying stocks under its review. According to the October 3, 2003, edition of *Value Line*, the expected dividend yield is 1.9 percent and the expected annual growth in share price is 10.67 percent.[14] Therefore, the constant-growth DCF estimate of the cost of equity to all dividend-paying stocks followed by *Value Line* is 12.6 percent. Using a beta of 1.00 and the current long-term risk-free rate of 5.22 percent, the implied current market risk premium is also 7.4 percent.[15]

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[14] 3 to 5 year price appreciation potential is 50%. $1.50^{1/4} - 1 = 10.67\%$

Q. What are the results of Staff's CAPM analysis?

A. Schedule JMR-7 shows the results of Staff's CAPM analysis. Staff's CAPM cost of equity estimate is 8.7 percent.

IV. FINAL COST OF EQUITY ESTIMATES FOR APS

Q. Please summarize the results of Staff's cost of equity analysis.

A. The following table shows the results of Staff's cost of equity analysis:

Table 4

Method	Estimate
Average DCF Estimate	9.1%
Average CAPM Estimate	8.7%
Overall Average	**8.9%**

Staff's average estimate of the cost of equity to the electric utility industry is 8.9 percent.

Q. What is Staff's ROE recommendation for APS?

A. Staff's ROE recommendation for APS is 9.0 percent.

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[15] 12.6% = 5.22% + 1.00 x (current market risk premium); 7.4% = current market risk premium.
A long-term rate is used here because the constant-growth DCF model does not assume a holding period other than infinity. Therefore, a long-term risk-free rate is used for consistency.

Commission Decision No. 66567 - Adjustment Clause

Q. Please provide a brief background of decision No. 66567.

A. Decision No. 66567, dated November 18, 2003, approved the concept of a purchased power adjuster ("adjuster") for APS, the details of which are to be decided in this proceeding. In approving the concept of an adjuster, the Commission adopted several conditions proposed by Staff, including condition number 10, which states that a "reduction of risk should be considered in the cost of equity in APS' next rate case."[16]

Q. Did Staff adjust its ROE recommendation to reflect reduced risk resulting from an adjuster?

A. Staff found through its research that while support may exist for reducing the ROE for a utility that institutes an automatic adjustment clause, such reduction might very well be small and difficult to quantify. Further, Staff did not formulate a method to estimate the reduction because many of the companies in Staff's sample of electric utilities already have adjusters. To the extent such reduced risk is related to market risk, it is reflected in Staff's market-based analysis.

V. RATE OF RETURN RECOMMENDATION

Q. What is Staff's rate of return recommendation for APS?

A. Staff recommends a ROR of 7.3 percent for APS, as shown in Schedule JMR-8 and the following table:

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[16] Decision No. 66567, dated November 18, 2003. p. 8 at 16. Finding of Fact No. 17. p. 23 at 10 – 11.

Table 8

	Weight	Cost	Weighted Cost
Long-term Debt	54.8%	5.82%	3.19%
Common Equity	45.2%	9.0%	4.07%
Cost of Capital/ROR			**7.3%**

Financial Integrity

Q. Will Staff's recommendation allow APS to maintain its financial integrity?

A. Yes. Staff's ROR recommendation results in a pre-tax interest coverage ratio of 3.1 calculated in column F of Schedule JMR-8. Interest coverage is one of the determinants of a company's bond rating – other things equal, a higher ratio of earnings to interest results in a higher bond rating. According to Standard & Poor's ("S&P") 2003 Corporate Ratings Criteria, the median interest coverage ratio for an 'A' rated utility is 3.0.[17]

VI. COMMENT ON THE DIRECT TESTIMONY OF COMPANY WITNESS CHARLES E. OLSON

Q. What topics will Staff address in this portion of its testimony?

A. Staff will address Company witness Dr. Olson's testimony regarding the Company's proposed capital structure alternatives, and his recommended ROE, including his proposed financing cost adjustment.

Capital Structure

Q. On page 9 of his direct testimony Dr. Olson suggests that the Company's two alternative capital structures do not affect the cost of equity. (See direct testimony of Charles E. Olson. P. 9 at 20 – 24.) Is he correct?

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[17] Standard & Poors 2003 Corporate Ratings Criteria. P. 50.

A. No. As a firm increases its leverage, the cost of equity goes up lockstep with beta. Therefore, a lower percentage of debt results in a lower level of financial risk and a lower cost of equity.

Q. How does relying on a 50/50 debt-to-equity capital structure rather than a 55/45 debt-to-equity capital structure affect APS' cost of equity?

A. Relying on a 50/50 debt-to-equity capital structure rather than a 55/45 debt-to-equity capital structure lowers APS' cost of equity by approximately 30 basis points. This 30 basis point discount represents the required financial risk adjustment resulting from a capital structure that is less leveraged than the average capital structure of the sample electric utilities. Staff calculated this financial risk adjustment using the methodology developed by Professor Robert Hamada of the University of Chicago, which incorporates capital structure theory with the CAPM. The Hamada equation is generally used to estimate the effect leverage has on a stock's beta. The negative 30 basis point cost of equity adjustment required if the Commission adopts a 50/50 debt-to-equity capital structure is shown in Schedules JMR-9 through JMR-11.

Return on Equity

Q. What return on equity does Dr. Olson recommend for APS?

A. Dr. Olson recommends a ROE range of 11.25 to 11.75 percent.

Q. What reasonableness test can Staff apply to his recommendation before discussing his methods?

A. One reasonableness test is to compare Dr. Olson's 11.25 to 11.75 percent recommendation to the historical overall market returns that Staff discussed earlier. Dr. Olson's 11.25 to

11.75 percent recommendation exceeds a reasonable cost of equity estimate for an average-risk security (based on actual returns). As previously shown in Chart 1 and Chart 2, interest rates have declined in recent years, suggesting that capital costs, including the cost of equity, are lower than they have been in recent decades.

Also, Earlier Staff testified that the average beta for the electric utility industry is .67. An 11.25 to 11.75 percent cost of equity for an average electric utility implies an 11 to 12 percent market risk premium ([11.25% to 11.75% - 3.7%]/.67). This exceeds Staff's estimate of both the current and historical market risk premiums, and is contrary to suggestions by academics that the current equity risk premium is lower than the historical equity risk premium in general.[18]

Dr. Olson's DCF Estimates

Sample Selection

Q. On page 20 of his direct testimony, Dr. Olson suggests that his sample group is less risky than APS. (See direct testimony of Charles E. Olson. P. 20 at 4 – 5.) Is he correct?

A. No. According to Attachment CEO-3 of Dr. Olson's direct testimony, the companies in his comparable group are comprised of approximately 60 percent debt and 40 percent equity. As stated previously, a higher debt ratio equates to greater financial risk and results in a higher cost of equity. This is evidenced by the average beta of the companies in Dr. Olson's comparable group, which is .75. (See Table 5)

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[18] Siegel. pp. 16 – 18, 121 – 122.

Table 5

	Dr. Olson's Comparable Group	Staff's Sample Electric Utilities	APS
Beta	.75	.67	N/A
Debt Ratio	60%	56%	55%

According to the Hamada methodology mentioned above, the cost of equity to the companies in Dr. Olson's comparable group is 50 to 70 basis points *higher* than the cost of equity to APS, depending on which capital structure is employed.

Miscalculated Dividend Yield

Q. Explain how Dr. Olson's use of a six-month average dividend yield in his DCF analysis is inappropriate.

A. Dr. Olson's DCF estimates based on six-month average dividend yields are inappropriate because there is no point in "smoothing" stock prices for use in a model that assumes perfect markets. The expected dividend yield requires the most recent spot stock price in the denominator of the calculation (D_1/P_0). Professor Myron Gordon, the father of modern DCF analysis, advises:

> The term for dividend yield in Eq. [1] expression for a share's yield is the forecast dividend for the coming period, D_1, divided by the current price, P_0. The value assigned to P_0 should be the price of the share at the time the share yield is being estimated. The rationale for using the current price is that at each point in time it reflects all the information available to a company's investors regarding future dividends.[19]

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[19] Testimony of professors Myron J. Gordon and Lawrence I. Gould, consultants to the Trial Staff (Common Carrier Bureau), FCC Docket 79-63. p. 63.

The spot stock price is the only appropriate price to use in the denominator of the DCF equation in order to maintain consistency with the efficient markets hypothesis, a crux of modern corporate finance theory.

Q. Can Staff cite any further support for the use of a spot yield rather than a historical average?

A. Yes. The tendency of some analysts to overlook financial principles and use a historical average dividend yield was the focus of a 1996 article in *Public Utilities Fortnightly* by Steven Kihm:

> To the extent that prior yields form a reference point for expectations of future yields, the information content of historic yields is already included in the current spot yield. Thus, to average the historic yield with the spot yield simply double counts any relevant historic information and leads us away from rather than toward the actual future yield.
>
> Note also that by averaging historical data we introduce more distant data into the analysis. This forces us to put less weight on the current spot yield, so that we can consider yields estimated in a period where market participants knew less about next year than they do today. This simply does not make sense.

In the above referenced article, Mr. Kihm reported the results of his empirical analysis of utility bond yields and electric utility dividend yields from 1954 to 1993. The results of his study of historical average and spot dividend yields were qualitatively identical to his results for bond yields:

> By all accuracy measures, the spot forecast outperforms the forecasts based on historic averages. The spot forecast is also dominant in terms of

> volatility reduction. And we see clearly the longer the averaging period, the worse the forecasting method by any measure.[20]

Q. Has the Commission ruled on the use of spot market data in estimating the cost of capital?

A. Yes. In Decision No. 64727, dated April 17, 2002, the Commission agreed with Staff's use of spot market data in estimating the cost of debt and equity.[21]

Q. Are there additional problems with Dr. Olson's calculation of the expected dividend yield?

A. Yes. Dr. Olson's expected dividend yield for IDACORP is biased severely upward.

Q. Please explain how Dr. Olson's dividend yield for IDACORP is biased upward.

A. According to Attachment CEO-6 of Dr. Olson's direct testimony, he calculates an average dividend yield for IDACORP of 7.67 percent, which is the highest of all of the companies in his sample. Dr. Olson ultimately adjusts this yield upward by multiplying it by one-half his expected dividend growth rate of 5.0 to 5.5 percent, resulting in an expected dividend yield for the coming period (D_1/P_0) for IDACORP of 7.87 percent.[22] Dr. Olson essentially assumes that IDACORP will pay dividends totaling $1.91 over the next year.[23] However, on September 18, 2003, IDACORP announced that it will reduce its annual dividend from $1.86 to $1.20. Therefore, investors logically expect IDACORP to pay a dividend of $1.20 in the next twelve months, not $1.91. Thus, the appropriate annual dividend rate to use in the expected dividend yield (D_1/P_0) component of the DCF formula is $1.20, not

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[20] Kihm, Steven G. "The Superiority of Spot Yields in Estimating Cost of Captial." *Public Utilities Fortnightly.* February 1, 1996. pp. 42 – 45.

[21] Application of Black Mountain Gas Company. Docket No. G-03703A-01-0263.

[22] See direct testimony of Charles E. Olson, p. 22 at 1 – 23: [7.67%{1+.5(5.25%)}] = 7.87%

[23] Dividend rate of $1.86 (per Attachment CEO-6) x [1+{.5(5.25%)}] = $1.91

$1.91. As of October 9, 2003, Dr. Olson's expected dividend yield for the coming period (D_1/P_0) for IDACORP is overstated by 338 basis points.[24]

Expected Growth Calculation Problem

Q. Explain how Dr. Olson's exclusive reliance on analysts' forecasts of earnings growth is inappropriate to forecast dividend growth and results in inflated cost of equity estimates.

A. Dr. Olson's exclusive reliance on analysts' forecasts of earnings growth in his DCF analysis is inappropriate because it assumes that investors do not look at other information such as past and forecasted growth DPS and intrinsic growth.

Q. Is there a problem with relying exclusively on analysts' forecasts of earnings growth in a DCF analysis?

A. Yes. Analysts' forecasts of earnings are known to be overly optimistic.

Q. How do you respond to Dr. Olson's statement that, "financial analysts who make earnings forecasts are aware of historical growth rates. This means the historical information is reflected in these forecasts to the extent deemed relevant. Therefore, it is not necessary to use it again..." (See direct testimony of Charles E. Olson. P. 21 at 19 – 23.)

A. While Staff agrees that professional analysts may have considered past growth in their forecasts, the appropriate dividend growth rate to use in the DCF formula is the dividend growth rate expected by investors, not reported by analysts. Therefore, the reasonable assumption that investors rely, to some extent, on past growth in addition to analysts' forecasts, warrants consideration of both.

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[24] IDACORP's stock price on October 9th, 2003: $26.7. [7.87% - ($1.20 ÷ $26.70) = 3.38%]

Q. How does Dr. Olson's exclusive reliance on analysts' forecasts of earnings growth result in inflated cost of equity estimates?

A. Dr. Olson's exclusive reliance on analysts' forecasts of earnings growth results in inflated cost of equity estimates because analysts' earnings forecasts are known to be overly optimistic. To the extent that investors are aware of the bias in analysts' projections of future earnings, they will make appropriate adjustments.

Q. Can Staff provide evidence to support its testimony that analysts' forecasts of future earnings are high?

A. Yes. Many experts in the financial community have commented on bias/over-optimism in analysts' forecasts of future earnings.[25] A study cited by David Dreman in his book *Contrarian Investment Strategies: The Next Generation* found that *Value Line* analysts were optimistic in their forecasts by 9 percent annually, on average for the 1987 – 1989 period. Another study conducted by David Dreman found that between 1982 and 1997, analysts overestimated the growth of earnings of companies in the S&P 500 by 188 percent.

Burton Malkiel of Princeton University studied the one-year and five-year earnings forecasts made by some of the most respected names in the investment business. The results showed that, when compared with actual earnings growth rates, the five-year estimates of professional analysts were worse than the predictions from several naïve forecasting models, such as the long-run rate of growth in national income. Professor Malkiel discusses the results of his study in the following quote from his book *A Random Walk Down Wall Street*:

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[25] See Seigel, Jeremy J. *Stocks for the Long Run*. 2002. McGraw-Hill. New York. p. 100 Malkiel, Burton G. *A Random Walk Down Wall Street*. 1999. W. W. Norton & Co. New York. p. 169. Dreman, David. *Contrarian Investment Strategies: The Next Generation*. 1998. Simon & Schuster. New York. pp. 97 – 98. Testimony of Professors Myron J. Gordon and Lawrence I Gould, consultants to the Trial Staff (Common Carrier Bureau). FCC Docket 79-63. p. 95. Claymen, Michelle R., Robin A. Schwartz. "Falling in Love Again – Analysts' Estimates and Reality." *Financial Analysts Journal*. Sep/Oct 1994. 66 – 68.

> When confronted with the poor record of their five-year growth estimates, *the security analysts honestly, if sheepishly, admitted that five years ahead is really too far in advance to make reliable projections*. They protested that although long-term projections are admittedly important, they really ought to be judged on their ability to project earnings changes one year ahead.
>
> Believe it or not, it turned out that their one-year forecasts were even worse than their five-year projections. It was actually harder for them to forecast one year ahead than to estimate long-run changes.
>
> The analysts fought back gamely. They complained that it was unfair to judge their performance on a wide cross section of industries, because earnings for electronics firms and various "cyclical" companies are notoriously hard to forecast. *"Try us on utilities," one analyst confidently asserted. So we tried it and they didn't like it. Even the forecasts for the stable utilities were far off the mark. Those the analysts confidently touted as high growers turned out to perform much the same as the utilities for which only low or moderate growth was predicted.*[26] (emphasis added)

Q. Are investors aware of the problems associated with analysts' forecasts?

A. Yes. In addition to books, numerous articles appearing in *The Wall Street Journal* and other publications have cast a negative light on research analysts and their forecasts.[27]

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[26] Malkiel. pp. 168 – 169.

[27] See Brown, Ken. "Analysts: Still Coming Up Rosy." *The Wall Street Journal*. January 27, 2003. p. C1. Karmin, Craig. "Profit Forecasts Become Anybody's Guess." *The Wall Street Journal*. January 21, 2003. p. C1. Gasparino, Charles. "Merrill Lynch Investigation Widens." *The Wall Street* Journal. April 11, 2002. p. C4. Elstein, Aaron. "Earnings Estimates Are All Over the Map." *The Wall Street Journal*. August 2, 2001. p. C1. Dreman, David. "Don't Count on those Earnings Forecasts." *Forbes*. January 26, 1998. p. 110.

One such article, entitled "Analysts: Still Coming Up Rosy" appeared in the January 27th, 2003, edition of *The Wall Street Journal*. According to the article, "stock analysts are unshaken in their optimistic, if delusional, belief that most of the companies they cover will have above average, double-digit growth rates during the next several years. That is, of course, highly unlikely." As stated previously, to the extent investors are aware of the bias in analysts' projections of future earnings, they will make appropriate adjustments.

Q. Can Staff identify any other problems with relying exclusively on analysts' forecasts?

A. Yes. Another problem with relying exclusively on analysts' forecasts and ignoring past growth is that the results are entirely dependant on the source of the particular forecast. For example, Dr. Olson relies on the average earnings growth forecast for the companies in his comparable group provided by *First Call*, which is 5.2 percent. (See direct testimony of Charles E. Olson. Attachment CEO-7.) However, *Zacks Investment Research* projects an average near-term earnings growth rate of 4.4 percent for the companies in Dr. Olson's comparable group. It should also be noted that *First Call* has revised its estimates, and now projects a near-term earnings growth rate of only 4.6 percent for the companies in Dr. Olson's comparable group.

Restatement of Dr. Olson's DCF Estimate

Q. Has Staff restated Dr. Olson's DCF cost of equity estimate to reflect the above information regarding his DCF analysis?

A. Yes. Below, Staff restates Dr. Olson's DCF cost of equity estimate to reflect (1) APS having less financial risk than the companies in Dr. Olson's sample, as evidenced by its capital structure, (2) spot market data as of October 9th, 2003, and (3) revision of the average projected near-term earnings growth rate provided by *First Call.*

Table 6

D_1/P_0	+	g	=	Cost of Equity to Sample Co.'s	Financial Risk Adjustment	=	**Cost of Equity to APS**
5.0%	+	4.6%	=	9.6%	-50 to -70 basis points	=	**8.9% to 9.1%**

Staff's restatement *does not* incorporate the reasonable assumption that investors would examine other factors as indicators of expected dividend growth that would lower their estimate, such as past DPS, EPS, and intrinsic growth in addition to analysts' projections of future earnings growth, which are considered to be high.

Dr. Olson's Risk Premium Study

Q. What is Dr. Olson's "risk premium" study?

A. Dr. Olson examines the historical difference between returns on the S&P 500 and the Salomon Brothers Long-Term High-Grade Corporate Bond Index as reported by Ibbotson Associates' in *Stocks, Bonds, Bills and Inflation.* The period he used was 1926 to 2002. His risk premium estimate is 6.0 percent. He adds this estimate to the average yield on Moody's medium grade (Baa rated) corporate bonds for April and May 2003, of 6.6 percent to arrive at a cost of equity estimate of 12.6 percent. (See direct testimony of Charles E. Olson. p. 23 at 10 – 25.)

Q. Is Dr. Olson's risk premium study valid to estimate APS' cost of equity?

A. No. First, Staff has concerns about the use of a corporate bond rate to imply meaningful equity risk premiums. Because a corporate bond contains some default risk which is diversifiable, the investor's expected rate of return is lower than the bond's yield to maturity. Therefore, the yield to maturity on a corporate bond cannot be compared to the cost of equity. Professor Laurence Booth of the Rotman School of Management at the University of Toronto states the following:

> As for the premium over long term A bond yields, it has to be pointed out here that corporate bonds are default risky. The maximum return you can get from a corporate bond held to maturity is the yield to maturity. Since corporate bonds are default risky, the investor's expected rate of return is significantly lower than the yield to maturity. As a result, *the yield to maturity on a corporate bond is not an estimate of the investor's required rate of return, and cannot be meaningfully compared to the [cost of equity]*. Only the yield to maturity on a default free government bond is an estimate of a required rate of return, similar to the [cost of equity]. This is why *all risk comparisons should be to government default free bonds, otherwise you mix apples and oranges.*[28] (emphasis added)

Second, Dr. Olson's risk premium study is not appropriate because he misapplies the historical differential between S&P 500 returns and *high grade* corporate bond yields to the current yield on *medium grade* bonds. According to Attachment CEO-1, page 4 of Dr. Olson's direct testimony, Baa rated (medium grade) corporate bond rates were, on average, 114 basis points *higher* than Aaa rated (high grade) corporate bond rates in April and May 2003. To the extent there is any validity to such a risk premium study, Dr. Olson's cost of equity estimate is inflated by 114 basis points due to the yield spread between Aaa rated and Baa rated corporate bonds.

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[28] Booth, Laurence. "The Importance of Market-to-Book Ratios in Regulation." *NRRI Quarterly Bulletin*. Winter 1997. pp. 415 – 425.

Third, Dr. Olson's risk premium study is quickly dismissed because it in no way assesses the risk of an electric utility. Electric utilities are significantly less risky than the average risk security, as evidenced by CAPM betas. Dr. Olson's risk premium study measures APS' cost of equity as if it currently had the risk of an average-risk security. Dr. Olson's risk premium study is inappropriate because it fails to distinguish the risk of an electric utility company from the risk of the S&P 500. The S&P 500 includes a wide range of companies from a wide range of industries, including aerospace/defense, computers (software), leisure time products, etc. This Commission should not estimate APS' cost of equity based on stock market returns in these other industries with patently differing risks from the risks of providing electric power.

Finally, while the risk premium approach is based on a general rule of thumb that common stocks are riskier than bonds, the Commission should primarily rely on cost of equity models developed in the corporate finance literature rather than on rules of thumb. Staff recommends that the Commission rely on the DCF method and CAPM rather than Dr. Olson's risk premium study. The DCF method is the most widely used model for estimating the cost of equity in public utility rate cases. The CAPM was developed by Nobel Prize winning economists and is the most popular method for estimating the cost of equity among CFOs.[29]

Dr. Olson's Financing Cost Adjustment

Q. What is Dr. Olson's financing cost adjustment and how did he calculate it?

A. Dr. Olson recommends adding 17 to 18 basis points to his cost of equity estimates to account for the costs associated with issuing new common shares, as well as "market pressure" associated with new stock offerings. (See direct testimony of Charles E. Olson. P. 24 at 12 – 22 & P. 26 at 8 – 16.) His cost of equity estimates range from 11.07 percent to 11.58 percent. He adjusts these estimates upward to 11.25 percent to 11.75 percent to account for financing costs. (See direct testimony of Charles E. Olson. P. 26 at 10 – 16.) In support of his adjustment Dr. Olson provides information regarding the average percent commission paid by electric utilities in 2002 and 2003, which was 3.15 percent. Dr. Olson claims that 3.15 percent "is not sufficient, however, to provide Pinnacle West with a reasonable probability of issuing common shares at a price above book value because of capital market fluctuations." (See direct testimony of Charles E. Olson. P. 25 at 1 – 3.)

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[29] Graham, John R., Campbel R. Harvey. Pp. 187 – 243.

Q. Should the Commission adopt Dr. Olson's recommendation to boost the allowed ROE to account for financing costs and market pressure associated with issuing new equity?

A. No. As Staff explains below, the recovery of equity issuance expenses by increasing the allowed ROE is inappropriate.

Q. Does Dr. Olson consider all stock expenses in his testimony, such as fees that would *reduce* his adjustment?

A. No, he fails to consider stock purchase fees, otherwise known as brokers' fees, as opposed to the stock issuance fees he does consider. Brokers' fees result in an investor paying more than the price quoted on the stock exchange, and would reduce the required dividend yield in the DCF, offsetting the issuance cost adjustment.[30]

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[30] The effect of brokers' fees is analyzed in David Habr's article, "Commission Staff Report: A Note on Transaction Costs and the Cost of Common Equity for a Public Utility," *NRRI Quarterly Bulletin*. 9, no. 1, January 1988. pp. 95 – 104.

Q. Does Dr. Olson consider equity that was issued at little or no cost to the Company?

A. No. Dr. Olson failed to consider stock that Pinnacle West and other companies issue under employee stock ownership plans ("ESOP") and dividend reinvestment plans ("DRIP"), which save the underwriting costs of a regular share issue.

Q. Does Dr. Olson consider equity that is never issued, such as retained earnings?

A. No. Dr. Olson's method of increasing the authorized ROE also applies to retained earnings – equity that is never issued.

Q. On page 26 of his direct testimony Dr. Olson states that there is "market pressure" associated with stock offerings that should be compensated for in the ROE. (See direct testimony of Charles E. Olson. P. 26 at 13 – 15.) What is "market pressure?"

A. Market pressure is the presumed tendency for a company's stock price to decline after the announcement of a public offering, due to an increase in shares outstanding.

Q. Is the market pressure component consistent with the concept of efficient markets, the theory inherent in the DCF and CAPM?

A. No, the market pressure component is inconsistent with the efficient markets hypothesis as articulated by Brealey and Myers in their text *Principles of Corporate Finance*:

> Because stock issues usually throw a large additional supply of shares onto the market, it is widely believed that they must temporarily depress the stock price…This belief in price pressure implies that after the decline in price the company's shares can be bought for less than their true value. It is therefore inconsistent with market efficiency. The alternative view stresses that investors buy stocks because they offer a fair reward for their risk. If the stock price fell solely because of increased supply, then that stock

> would offer a reward which was *more* than commensurate with the risk, and investors would be attracted to it as donkeys to a thistle.[31]

The alternative explanation for a decline in stock price after the announcement of a public offering has nothing to do with the increased supply but simply with the information that the issue provides, such as management's view of the company's prospects for future growth. Brealey and Myers explain that most financial economists now interpret the stock price drop in equity issue announcements as an information effect and not a result of the additional supply.[32]

Q. On page 24 of his direct testimony Dr. Olson testifies that "if a return on common equity exactly equal to the investors' requirement is authorized and earned," when new shares are issued, net proceeds will be less than book value and existing shareholder investment will be diluted. Therefore, the authorized rate of return must be increased. (See direct testimony of Charles E. Olson. P. 24 at 13 – 22.) Is this approach consistent with the guidelines set forth by the Supreme Court in *Bluefield* and *Hope*?

A. No. As correctly noted by Dr. Olson on page 6 of his direct testimony (lines 6 – 14) the relevant rate of return contemplated by *Bluefield* and *Hope* is that return required by the investor (i.e. the cost of capital). Therefore, allowing a rate of return that is higher than the cost of capital, as Dr. Olson suggests, is inconsistent with *Bluefield* and *Hope*. Dr. Olson agrees with this concept when he states on page 5 (lines 13 – 18) of his direct testimony that "the purpose of pubic utility regulation with respect to rate of return is to permit the regulated company to earn its cost of capital … earnings levels above the cost of capital in the long-run imply excessive profits …" Dr. Olson's testimony is internally inconsistent.

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[31] Brealey, Richard A. Stewart C. Myers. *Principles of Corporate Finance*. McGraw-Hill, New York. 1991. p. 349.
[32] Brealey, Richard A. Stewart C. Myers. 2000. p. 423.

Q. How is Dr. Olson's proposal inconsistent with Commission treatment of stock issuance cost ROE adjustments?

A. To Staff's knowledge, the Commission has never added a stock issuance cost adjustment to the authorized ROE. Staff does not recommend that it do so in this case.

Q. Should a utility recover the cost of issuing new stock in rates?

A. Yes, the cost of issuing stock is a necessary cost of business. However, Staff recommends that stock issuance expenses should be treated as adjustments to revenue requirement based on actual expenses in the test year or some other reasonable and direct method, rather than boosting the allowed ROE. The expense method for recovering stock issuance costs directly estimates expected stock issuance costs and includes them in revenue requirement as expenses.

VII. CONCLUSION

Q. Please summarize your recommendations.

A. Staff recommends the Commission adopt a 9.0 percent ROE, a 5.82 percent cost of debt, and a 7.3 percent ROR. Staff recommends the Commission give little weight to the testimony of the Company's witness Dr. Charles Olson. Staff disagrees with his methods and his estimates are not representative of current costs of equity.

Q. Does this conclude your direct testimony?

A. Yes, it does.

Schedule JMR-1

Arizona Public Service Company
Average Capital Structure of Sample Electric Utilities

Line No.	[A] Company	[B] Long-Term Debt	[C] Common Equity
1			
2	Sample Electric Utilities	55.9%	44.1%
3			
4	Arizona Public Service Company	54.8%	45.2%
5			
6			
7			
8			
9			
10			
11	Source: Value Line		
12	Schedules D1 & D2 of the Company's application and the Company's response to STF 3.10, does not include vehicle lease obligation		

Arizona Public Service Company
Cost of Long-Term Debt
31-Dec-03

	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]	[K]	[L]	[M]
						Principal Amount		Net to Company					
Line No.	Interest Rate	Description	Issue Date	Maturity Date	Original Life	Original Issue	Currently Outstanding	Total Dollar Amount	Per $100 Principal Amount	Cost of Money to Company (Bond Table Basis)	Annual Debt Service Cost	B. P. Difference	Coupon Cost of Debt
1	5.500%	First mortgage bonds - fixed rat	09/02/93	08/15/28	35	$25,000	$25,000	$24,906	99.624%	5.524%	$1,381	2.44	$1,375
2	5.880%	First mortgage bonds - fixed rat	09/02/93	08/15/28	35	$141,150	$141,150	$140,625	99.628%	5.905%	$8,335	2.52	$8,300
3	5.880%	First mortgage bonds - fixed rat	09/02/93	08/15/28	35	$12,850	$12,850	$12,802	99.626%	5.905%	$759	2.54	$756
4	6.630%	First mortgage bonds - fixed rat	03/02/94	03/01/04	10	$100,000	$80,000	$98,731	98.731%	6.807%	$5,446	17.7	$5,304
5	1.690%	Pollution control bonds - variabl	09/14/94	09/01/24	30	$65,750	$65,750	$65,020	98.890%	1.738%	$1,143	4.76	$1,111
6	1.700%	Pollution control bonds - variabl	05/25/94	05/01/29	35	$57,000	$57,000	$56,501	99.125%	1.733%	$988	3.34	$969
7	1.750%	Pollution control bonds - variabl	05/25/94	05/01/29	35	$35,000	$35,000	$34,694	99.126%	1.784%	$624	3.36	$613
8	1.750%	Pollution control bonds - variabl	05/25/94	05/01/29	35	$35,000	$35,000	$34,694	99.126%	1.784%	$624	3.36	$613
9	1.750%	Pollution control bonds - variabl	05/25/94	05/01/29	35	$36,980	$36,980	$36,656	99.124%	1.784%	$660	3.38	$647
10	1.690%	Pollution control bonds - variabl	05/25/94	05/01/24	30	$49,400	$49,400	$48,803	98.791%	1.742%	$861	5.18	$835
11	1.690%	Pollution control bonds - variabl	09/14/94	09/01/24	30	$31,500	$31,500	$30,975	98.333%	1.762%	$555	7.18	$532
12	1.690%	Pollution control bonds - variabl	10/12/94	10/01/29	35	$32,650	$32,650	$31,981	97.951%	1.769%	$578	7.88	$552
13	1.690%	Pollution control bonds - variabl	12/12/96	12/01/31	35	$6,710	$6,710	$6,449	96.110%	1.841%	$124	15.12	$113
14	1.690%	Pollution control bonds - variabl	11/16/98	11/01/33	35	$16,870	$16,870	$16,661	98.761%	1.737%	$293	4.74	$285
15	1.690%	Pollution control bonds - variabl	04/07/99	04/01/34	35	$20,000	$20,000	$19,783	98.915%	1.731%	$346	4.14	$338
16		PCB Bank commitment fees			0						$3,348	0	$0
17	7.480%	Capitalized Lease	02/01/01	10/01/03	3	$650	$169	$650	100.000%	7.480%	$13	0	$13
18	5.450%	Capitalized Lease	11/01/01	11/01/06	5	$926	$678	$926	100.000%	5.450%	$37	0	$37
19	6.750%	Other Long-term Debt	11/22/96	11/15/06	10	$100,000	$83,695	$82,958	82.958%	9.418%	$7,882	266.8	$5,649
20	5.050%	Other Long-term Debt	11/01/02	05/01/29	27	$90,000	$90,000	$89,213	99.126%	5.110%	$4,599	6	$4,545
21	6.250%	Other Long-term Debt	01/13/98	01/15/05	7	$100,000	$100,000	$99,301	99.301%	6.375%	$6,375	12.54	$6,250
22	5.875%	Other Long-term Debt	02/24/99	02/15/04	5	$125,000	$125,000	$124,100	99.280%	6.044%	$7,555	16.9	$7,344
23	7.625%	Other Long-term Debt	08/07/00	08/01/05	5	$300,000	$300,000	$297,999	99.333%	7.789%	$23,367	16.36	$22,875
24	6.375%	Other Long-term Debt	10/05/01	10/15/11	10	$400,000	$400,000	$397,295	99.324%	6.468%	$25,872	9.28	$25,500
25	6.500%	Other Long-term Debt	03/01/02	03/01/12	10	$375,000	$375,000	$372,453	99.321%	6.594%	$24,728	9.38	$24,375
26	4.650%	Other Long-term Debt	05/15/03	05/15/15	12	$300,000	$300,000	$295,346	98.449%	4.822%	$14,466	17.18	$13,950
27	5.625%	Other Long-term Debt	05/15/03	05/15/33	30	$200,000	$200,000	$195,731	97.866%	5.776%	$11,552	15.06	$11,250
28													
29	Sum:					$2,657,436	$2,620,402	$2,615,253			$152,509		$144,130
30													
31													
32	Cost of Debt:	5.82%											5.50%
33													
34													
35													
36	Source: APS' response to STF 3.10, does not include $17,446 in vehicle lease obligation.												

Arizona Public Service Company
Selected Financial Data of Sample Electric Utilities

	[A]	[B]	[C]	[D]	[E]	[F]	[G]
Line No.	Company	Symbol	Spot Price 10/9/03	Book Value 10/9/03	Mkt To Book	*Value Line* Beta β	Raw Beta β_{raw}
1	Alliant Energy	LNT	23.08	20.09	1.1	0.70	0.52
2	Ameren	AEE	43.50	26.03	1.7	0.65	0.45
3	Avista	AVA	16.12	15.08	1.1	0.75	0.60
4	Cent. Vermont P.S.	CV	23.65	17.04	1.4	0.45	0.15
5	CH Energy Group	CHG	44.90	29.53	1.5	0.70	0.52
6	Cleco Corporation	CNL	16.81	10.71	1.6	0.90	0.82
7	Con. Edison	ED	40.73	28.62	1.4	0.55	0.30
8	DPL Inc.	DPL	18.35	6.74	2.7	0.80	0.67
9	DTE Energy Co.	DTE	36.25	28.10	1.3	0.60	0.37
10	Empire District	EDE	22.30	14.87	1.5	0.60	0.37
11	Energy East Corp.	EAS	23.44	17.53	1.3	0.70	0.52
12	Entergy Corp.	ETR	54.08	37.57	1.4	0.65	0.45
13	FirstEnergy	FE	32.58	24.60	1.3	0.70	0.52
14	FPL Group, Inc.	FPL	64.48	37.50	1.7	0.60	0.37
15	Green Mtn. Power	GMP	22.35	19.39	1.2	0.60	0.37
16	Hawaiian Electric	HE	44.13	29.41	1.5	0.55	0.30
17	IDACORP, Inc.	IDA	26.70	22.69	1.2	0.75	0.60
18	MGE Energy Inc.	MGEE	31.33	14.84	2.1	0.55	0.30
19	NiSource Inc.	NI	21.34	17.76	1.2	0.65	0.45
20	Northeast Utilities	NU	18.86	17.58	1.1	0.65	0.45
21	NSTAR	NST	46.90	25.50	1.8	0.65	0.45
22	P.S. Enterprise Gp.	PEG	40.74	19.09	2.1	0.75	0.60
23	Pinnacle West	PNW	35.64	30.18	1.2	0.70	0.52
24	PNM Resources	PNM	28.71	25.71	1.1	0.70	0.52
25	Progress Energy	PGN	44.49	30.10	1.5	0.85	0.75
26	Puget Energy, Inc.	PSD	22.90	16.60	1.4	0.65	0.45
27	SCANA Corp.	SCG	35.25	20.77	1.7	0.60	0.37
28	Sempra Energy	SRE	28.80	15.07	1.9	0.80	0.67
29	Southern Co.	SO	29.60	12.73	2.3	0.65	0.45
30	TECO Energy,Inc.	TE	14.71	13.27	1.1	0.75	0.60
31	Westar Energy	WR	18.98	14.39	1.3	0.60	0.37
32	Wisconsin Energy	WEC	31.28	19.76	1.6	0.60	0.37
33	WPS Resources	WPS	41.82	26.77	1.6	0.70	0.52
34							
35	Average				1.5	0.67	0.48
36							
37	Source: Yahoo Finance, Value Line						

Arizona Public Service Company
Growth in Earnings and Dividends
Sample Electric Utilities

Line No.	[A]	[B] Dividends Per Share 1997 to 2007 DPS	[C] Earnings Per Share 1997 to 2007 EPS
1			
2	Sample Electric Utilities	0.2%	3.4%
3			
4			
5			
6			
7	Source: Value Line		

Arizona Public Service Company
Intrinsic Growth
Sample Electric Utilities

Line No.	[A] Company	[B] Retention Growth 1998 to 2007 br	[C] Stock Financing Growth vs	[D] Intrinsic Growth 1998 to 2007 br + vs
1				
2	Sample Electric Utilities	4.5%	1.4%	5.9%
3				
4				
5				
6				
7				
8				
9				
10	Source: Value Line, MSN Money			

Arizona Public Service Company
Calculation of Expected Infinite Annual Growth in Dividends
Sample Electric Utilities

	[A]	[B]
Line No.		g
1	DPS Growth	0.2%
2	EPS Growth	3.4%
3	Intrinsic Growth	5.9%
7		
8	Average	3.2%
9		
10		
11		
12	Supporting Schedules: Schedule JMR-4 and Schedule JMR-5	

Arizona Public Service Company
Final Cost of Equity Estimates
Sample Electric Utilities

Line No.	[A]	[B]		[C]		[D]		[E]
	Constant Growth DCF			**D_1/P_0**	**+**	**g**	**=**	**k**
1	Constant Growth DCF Estimate			4.5%	+	3.2%	=	7.7%
2	Multi-Stage DCF Estimate						=	10.6%
3	**Average of DCF Estimates**							**9.1%**
4								
5	**CAPM Method**	**Rf**	**+**	**β**	**x**	**(Rp)**	**=**	**k**
6	Historical Market Risk Premium	3.7%	+	0.67	x	7.4%	=	8.7%
7	Current Market Risk Premium	3.7%	+	0.67	x	7.4%	=	8.7%
8	**Average of CAPM Estimates**							**8.7%**
9								
10								
11						**Average**		**8.9%**
12								
13	Source: The Wall Street Journal, Value Line, Yahoo Finance, Ibbotson Associates SBBI 2003 Yearbook							
14	Supporting Schedules: Schedule JMR-6							

Schedule JMR-8

Arizona Public Service Company
Capital Structure
And Weighted Cost of Capital

	[A]	[B]	[C]	[D]	[E]	[F]
Line No.		Weight (%)	Cost	Weighted Cost	Gross Rev. Conv. Factor	Grossed-Up Cost
1	Long-term Debt	54.8%	5.82%	3.19%	1.00	3.19%
2	Common Equity	45.2%	9.0%	4.07%	1.63	6.64%
3	Weighted Average Cost of Capital/ROR			7.3%		9.8%
4						
5				Pre-Tax Interest Coverage [3 ÷ 1]		3.1
6						
7						
8						
9						
10	Supporting Schedules: Schedule JMR-1, Schedule JMR-2, Schedule JMR-7					

Arizona Public Service Company
Calculation of Unlevered Beta
Sample Electric Utilities

$$\beta_{UL} = \frac{\beta_L}{1 + BD \div EC\ (1 - t)}$$

Where :

β_{UL} = unlevered beta
β_L = levered beta
BD = book debt
EC = equity capital
t = tax rate

Line No.	[A]	[B] Value Line Levered Raw Beta β_L	[C] Tax Rate t	[D] Book Debt BD	[E] Equity Cap EC	[F] Unlevered Raw Beta $\beta_{UL} = \frac{\beta_L}{1+\frac{BD}{EC}(1-t)}$
1						
2	Sample Electric Utilities	0.48	33%	0.56	0.44	0.26
3						
4						
5						
6						
7						
8	Source: Value Line					
9	Supporting Schedules: Schedule JMR-1, Schedule JMR-3					

Arizona Public Service Company
Calculation of Relevered Beta
Using 50/50 Debt-to-Equity Capital Structure

$$\beta_{RL} = \beta_{UL} \ (1 + (1 - t)BD \div EC)$$

Where :

β_{RL} = relevered beta

β_{UL} = unlevered beta

t = tax rate

BD = book debt

EC = equity capital

	[A]	[B]	[C]	[D]	[E]	[F]	[G]
Line No.		Unlevered Raw Beta β_{UL}	Book Debt BD	Equity Cap EC	Tax Rate t	Relevered Raw Beta $b_{RL}=\beta_{UL}$ (1+(1-t)BD/EC)) β_{RL}	Adjusted Relevered Beta .35 + .67(Raw Beta) β_{RL}
1							
2	Arizona Public Service Company	0.26	0.50	0.50	39.5%	0.41	0.63
3							
4							
5							
6							
7							
8							
9	Source: Schedule C3 of the Company's application, direct testimony of Charles E. Olson, p. 8 at 17 - p. 10 at 9						
10	Supporting Schedules: Schedule JMR-9						

Schedule JMR-11

Arizona Public Service Company
Required Capital Structure Adjustment
For Using 50/50 Debt-to-Equity Capital Structure

Line No.	[A]	[B]		[C]		[D]		[E]
	CAPM Method	**Rf**	**+**	β	**x**	**(Rp)**	**=**	**k**
1	Historical Market Risk Premium	3.7%	+	0.67	x	7.4%	=	8.7%
2	Current Market Risk Premium	3.7%	+	0.67	x	7.4%	=	8.7%
3	**Average of CAPM Estimates**							**8.7%**
4								
5	**Relevered Beta**	**Rf**		β		**(Rp)**		**k**
6	Historical Market Risk Premium	3.7%	+	0.63	x	7.4%	=	8.4%
7	Current Market Risk Premium	3.7%	+	0.63	x	7.4%	=	8.4%
8	**Average of CAPM Estimates**							**8.4%**
9								
10	Capital Structure Adjustment (8 - 3)							-0.3%
11								
12								
13								
14								
15	Supporting Schedules: Schedule JMR-7, Schedule JMR-10							

ARIZONA PUBLIC SERVICE COMPANY
RESPONSE TO STF 2-8
Balance of Long-term debt
as of June 30, 2003
(dollars In thousands)

(a) Description of loan or bond issuance	(b) Interest Rate	(c) Issue Date	(d) Maturity Date	(e) Original Issue	(f) Principal Outstanding	(g) Principal due within one year	(h)** Unamortized Debt Expense	(h)** Unamortized Debt Discount
First mortgage bonds - fixed rate	8%	2/9/1993	2/1/2025	150,000	-	-	284 ***	324 ***
First mortgage bonds - fixed rate	7.25%	8/10/1993	8/1/2023	100,000	54,150		574	930
First mortgage bonds - fixed rate	5.5%	9/2/1993	8/15/2028	25,000	25,000		678	67
First mortgage bonds - fixed rate	5.875%	9/2/1993	8/15/2028	141,150	141,150		1,098	377
First mortgage bonds - fixed rate	5.875%	9/2/1993	8/15/2028	12,850	12,850		151	34
First mortgage bonds - fixed rate	6.625%	3/2/1994	3/1/2004	100,000	80,000	80,000	76	27
Senior notes - fixed rate	6.75%	11/22/1996	11/15/2006	100,000	83,695		316	122
Pollution control bonds with senior notes - fixed rate	5.05%	11/1/2002	5/1/2029	90,000	90,000		638	
Pollution control bonds with senior notes - variable 1 year mode	1.700%	5/25/1994	5/1/2029	57,000	57,000		265	
Pollution control bonds with senior notes - variable 1 year mode	1.75%	5/25/1994	5/1/2029	35,000	35,000		161	
Pollution control bonds with senior notes - variable 1 year mode	1.75%	5/25/1994	5/1/2029	35,000	35,000		163	
Pollution control bonds with senior notes - variable 1 year mode	1.75%	5/25/1994	5/1/2029	36,980	36,980		172	
Pollution control bonds - variable daily rate	0.9%	5/25/1994	5/1/2024	49,400	49,400		428	
Pollution control bonds - variable daily rate	0.9%	9/14/1994	9/1/2024	65,750	65,750		526	
Pollution control bonds - variable daily rate	0.9%	9/14/1994	9/1/2024	31,500	31,500		387	
Pollution control bonds - variable weekly rate	1.05%	10/12/1994	10/1/2029	32,650	32,650		509	
Pollution control bonds - variable daily rate	1.43%	12/12/1996	12/1/2031	6,710	6,710		213	
Pollution control bonds - variable daily rate	1.05%	11/16/1998	11/1/2033	16,870	16,870		268	
Pollution control bonds - variable daily rate	1.43%	4/7/1999	4/1/2034	20,000	20,000		231	
Unsecured notes - fixed rate	6.25%	1/13/1998	1/15/2005	100,000	100,000		151	
Unsecured notes - fixed rate	5.875%	2/24/1999	2/15/2004	125,000	125,000	125,000	115	8
Unsecured notes - fixed rate	7.625%	8/7/2000	8/1/2005	300,000	300,000		890	621
Unsecured notes - fixed rate	6.375%	10/5/2001	10/15/2011	400,000	400,000		2,263	1,107
Unsecured notes - fixed rate	6.5%	3/1/2002	3/1/2012	375,000	375,000		2,237	2,294
Unsecured notes - fixed rate	5.625%	5/7/2003	5/15/2033	200,000	200,000		1,975	2,282
Unsecured notes - fixed rate	4.65%	5/7/2003	5/15/2015	300,000	300,000		2,430	2,196
Capitalized lease obligations - Vehicles	5.78% *	9/1/1999	9/1/2012	20,664	20,086	3,148		
Capitalized lease obligations - Tape Library	5.45%	10/24/2001	11/1/2006	926	629	252		
Capitalized lease obligations - EMC disk	7.75%	2/1/2001	9/1/2003	650	13	13		
					2,694,433	208,413	17,199	10,389

* Weighted average interest rate of all vehicle leases.

** Calculation assumes that these amounts are equal to "issuance costs (not expensed)".

*** The remaining outstanding debt balance of $33,075,000 for the 8% Series Due 2/1/2025 was redeemed on 4/7/2003.
The related unamortized debt expense and unamortized debt discount was reclassifed to loss on reacquired debt in 3rd quarter 2003.

(i)
During the 18 month period 1/1/2002 to 6/30/2003, Arizona Public Service did not have any redemption expense related to debt that was redeemed/reacquired.

Exhibit JMR 1
Page 2 of 2

ARIZONA CORPORATION COMMISSION STAFF SECOND SET OF DATA REQUESTS TO ARIZONA PUBLIC SERVICE COMPANY

IN THE MATTER OF THE APPLICATION OF ARIZONA PUBLIC SERVICE COMPANY FOR A HEARING TO DETERMINE THE FAIR VALUE OF THE UTILITY PROPERTY OF THE COMPANY FOR RATEMAKING PURPOSES, TO FIX A JUST AND REASONABLE RATE OF RETURN THEREON, TO APPROVE RATE SCHEDULES DESIGNED TO DEVELOP SUCH RETURN, AND FOR APPORVAL OF PURCHASED POWER CONTRACT

E-01345A-03-0437

STF 2-9 Please provide the June 30, 2003, dollar amount of common stockholders equity for Arizona Public Service Company.

Response:

The common stockholders equity amount at June 30, 2003 is $2,155,473,000.

Witness: Chris N. Froggatt

ARIZONA CORPORATION COMMISSION STAFF THIRD SET OF DATA REQUESTS
TO ARIZONA PUBLIC SERVICE COMPANY
IN THE MATTER OF THE APPLICATION OF ARIZONA PUBLIC SERVICE COMPANY FOR A HEARING TO DETERMINE THE FAIR VALUE OF THE UTILITY PROPERTY OF THE COMPANY FOR RATEMAKING PURPOSES, TO FIX A JUST AND REASONABLE RATE OF RETURN THEREON, TO APPROVE RATE SCHEDULES DESIGNED TO DEVELOP SUCH RETURN, AND FOR APPORVAL OF PURCHASED POWER CONTRACT
E-01345A-03-0437

STF 3-10 Refer to Schedule D-2, page 1, column "End of Projected Year 12/31/2003" of the Company's application. Please provide a schedule giving a description of the particular loans or bond issuances that are included in each class of debt, the amount expected to be outstanding on 12/31/2003, and provide calculations supporting the annual interest for each loan or bond issuance.

RESPONSE:

Attached are the supporting schedules for Schedule D-2 for the "End of Projected Year 12/31/2003" that provide a description of the bonds, the issue date, the due date, the amount expected to be outstanding on 12/31/03, the original principal amount, and the net proceeds from the original issue. The annual interest is calculated using the "Yield to Maturity" formula. (RC01563)

Witness: Chris Froggatt

Exhibit JMR-2
Page 2 of 3

Schedule D-2

Backup page 1

ARIZONA PUBLIC SERVICE COMPANY
Projected Cost of Long-Term Debt
First Mortgage Bonds Outstanding
December 31, 2003
(Thousands of Dollars)

Line No.	Series	Offering Date	Due Date	Prin Amt of Issue	Prin Amt Outstdng	Net Proceeds From Prin Amt of Issue	Cost of Money	Annualized Interest	Line No.
1	0.0550	09/02/93	08/15/28	25,000	25,000	24,906	5.52%	1,381	1
2	0.0588	09/02/93	08/15/28	141,150	141,150	140,625	5.90%	8,328	2
3	0.0588	09/02/93	08/15/28	12,850	12,850	12,802	5.90%	758	3
4	0.0663	03/02/94	03/01/04	100,000	80,000	98,731	6.80%	5,443	4
5									5
6	Total				$ 259,000		6.14%	$ 15,910	6

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Exhibit JMR-2
Page 3 of 3

ARIZONA PUBLIC SERVICE COMPANY
Projected Cost of Long-Term Debt
Other Long-Term Debt Outstanding
December 31, 2003
(Thousands of Dollars)

Schedule D-2

Backup page 2

Line No.	Series	Offering Date	Due Date	Prin Amt of Issue	Prin Amt Outstdng	Net Proceeds From Prin Amt of Issue	Cost of Money	Annualized Interest	Line No.
	Pollution Control Indebtedness*								
1	1.69%	09/14/94	09/01/24	65,750	$65,750	$65,020	1.74%	$1,143	1
2	1.70%	05/25/94	05/01/29	57,000	57,000	56,501	1.73%	988	2
3	1.75%	05/25/94	05/01/29	35,000	35,000	34,594	1.78%	624	3
4	1.75%	05/25/94	05/01/29	35,000	35,000	34,694	1.78%	624	4
5	1.75%	05/25/94	05/01/29	36,980	36,980	36,556	1.78%	660	5
6	1.69%	05/25/94	05/01/24	49,400	49,400	48,803	1.74%	861	6
7	1.69%	09/14/94	09/01/24	31,500	31,500	30,975	1.76%	555	7
8	1.69%	10/12/94	10/01/29	32,650	32,650	31,981	1.77%	578	8
9	1.69%	12/12/96	12/01/31	6,710	6,710	6,449	1.84%	124	9
10	1.69%	11/16/98	11/01/33	16,870	16,870	16,661	1.74%	293	10
11	1.69%	04/07/99	04/01/34	20,000	20,000	19,783	1.73%	346	11
12									12
13	Bank Commitment Fees							3,348	13
14	Total PC Indebtedness				$ 386,860		2.62%	$ 10,144	14
15									15
16	* All Rates are Adjusted Daily								16
17									17
18	Capitalized Lease Obligation								18
19	7.48%	2/01/01	10/01/03	$650	169	$650	7.75%	$13	19
20	5.45%	11/01/01	11/01/06	$926	678	$926	5.45%	$37	20
21				$19,554	17,446	$19,554	5.78%	$1,008	21
22	Total Capitalized Lease Obligation				18,293		5.79%	$1,058	22
23									
24	6.75%	11/22/96	11/15/06	100,000	83,695 a	82,958	6.82%	$5,707	24
25	5.05%	11/01/02	05/01/29	90,000	90,000 a	89,213	5.11%	$4,598	25
26	6.25%	01/13/98	01/15/05	100,000	100,000	99,301	6.38%	$6,377	26
27	5.875%	02/24/99	02/15/04	125,000	125,000	124,100	6.05%	$7,564	27
28	7.6250%	08/07/00	08/01/05	300,000	300,000	297,999	7.80%	$23,386	28
29	6.3750%	10/05/01	10/15/11	400,000	400,000	397,295	6.54%	$26,170	29
30	6.5000%	3/01/02	3/1/12	375,000	375,000	372,453	6.66%	$24,989	30
31	4.6500%	05/15/03	05/15/15	300,000	300,000	295,346	4.82%	$14,469	31
32	5.6250%	05/15/04	05/15/33	200,000	200,000	195,731	5.78%	$11,563	32
33	Total Other Long-Term Debt			$ 2,011,130	$ 1,991,988		6.32%	$ 125,881	33

a. Other Long-Term Debt Senior Notes

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